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# RESEARCH MEMORANDUM

## SELECTION CRITERIA FOR PROFESSIONAL MILITARY EDUCATION

✓ Timothy E. Rupinski

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Encl: (1) CNA Research Memorandum 87-148, "Selection Criteria for Professional Military Education," by Timothy Rupinski, Unclassified, Aug 1987

1. Enclosure (1) is forwarded as a matter of possible interest.
2. The Marine Corps provides Professional Military Education (PME) for its noncommissioned officers. Each level of training is designed to provide the leadership skills necessary for advancement in rank. This research memorandum, completed as part of a larger study of PME, examines the criteria used in selecting Marines for the training.

A handwritten signature in black ink, appearing to read "William H. Sims", is positioned above the typed name.

William H. Sims  
Director, Manpower and Training Program  
Marine Corps Operations Analysis Group

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# SELECTION CRITERIA FOR PROFESSIONAL MILITARY EDUCATION

Timothy E. Rupinski

*Marine Corps Operations Analysis Group*

A Division of



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## CENTER FOR NAVAL ANALYSES

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## **ABSTRACT**

The Marine Corps provides Professional Military Education (PME) for its noncommissioned officers. Each level of training is designed to provide the leadership skills necessary for advancement in rank. This research memorandum shows that prior performance, time in grade, length to end of active service, and operational commitments affect the selection of eligible Marines into some of the resident courses.

## **EXECUTIVE SUMMARY**

The Marine Corps has a system of Professional Military Education (PME) for its noncommissioned officers (NCOs). The purpose of this education is to develop the leadership skills and knowledge that Marines need as they assume the increased responsibilities that accompany advancement in rank. The education is provided through a series of courses that may be taken in residence at a PME school or by correspondence. This research memorandum examines the criteria used in selecting Marines for the resident PME courses, including prior performance and various service-related and personal characteristics.

## **BACKGROUND**

PME consists of four courses: Basic, Career, Advanced, and Senior. The Basic course has the largest enrollment since it is intended for corporals and sergeants. It is taught in residence at 17 Basic schools and lasts three weeks. The Career course is the second largest and is targeted toward staff sergeants. The resident Career course is taken at three NCO staff academies and lasts six weeks. A correspondence version of the Basic and Career courses is required of Marines in these pay grades who have not completed the appropriate resident courses.

The Advanced and Senior courses are taught exclusively in residence at Quantico. The Advanced course is designed to train first sergeants and master sergeants and lasts ten weeks. In contrast, the Senior program is a one-week course intended for master gunnery sergeants and sergeants major. Neither the Advanced nor the Senior course is required.

## **DATA AND METHODOLOGY**

The data for analyzing the selection criteria consist of rosters of former PME students, the March 1986 Headquarters Master File (HMF), and performance data from two sources. For corporals, performance is measured by proficiency marks on the Proficiency/Conduct reports. "General value to the service" was extracted from the Fitness reports of Marines ranked sergeant or above to serve as their measure of performance.

The analysis involves comparing the characteristics of Marines who complete the resident course to the untrained Marine Corps population of the same pay grade.

Since the data does not provide a complete list of the trained population, part of the trained population is misclassified as untrained. As a result, real differences in the characteristics between the two groups tend to be understated.

A survey of Marines who supervise those who are eligible for PME training was conducted in the latter half of 1986. Supervisors were asked to evaluate the role of performance and operational commitments on selection into each of the resident courses.

## RESULTS

Marines are not randomly selected for PME training. The factors that influence selection into the resident courses are summarized below.

- The prior performance marks of Marines selected for the Basic and Career courses tend to be lower than those of unselected Marines in the same pay grades. In contrast, the prior performance marks of Marines selected for the Advanced course tend to be higher than those of unselected Marines in the same grade.
- The main reasons that supervisors give for selecting Marines for PME training are that the training benefits the students and it benefits their units.
- Supervisors generally perceive that the gain in performance from the training in each of the resident PME courses is worth (or exceeds) the loss of the services of average or top performers to the unit during the course. For marginal performers, a majority of supervisors hold this view only in the case of the Basic course.
- The supervisor survey suggests that units benefit the most when average performers are selected for the Basic and Career courses and top performers are selected for the Advanced and Senior courses.
- Those who are selected to receive PME training tend to have less time in grade and more time to the end of their contract than Marines of the same pay grade who are not selected.
- Operational commitments that remove units from their garrison reduce the availability of Basic and Career resident training. Units typically respond to



this predicament by having their personnel take correspondence courses and by filling PME quotas with whoever is available. However, almost 20 percent of the supervisors whose units spend any time away from their garrison could not fill their PME quota because of their operational commitments.

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## INTRODUCTION

The Marine Corps provides Professional Military Education (PME) to its non-commissioned officers (NCOs). In this research memorandum, the factors that affect selection into the resident courses will be examined. In addition, opinions on the role of performance in selection are solicited from former PME students and their supervisors.

Professional Military Education consists of four levels of instruction: Basic, Career, Advanced, and Senior. Each course is designed to provide the NCO with education and leadership training appropriate for assuming the greater responsibilities that accompany advancement in rank. As described in [1], the sequence offers an opportunity for professional development to all NCOs, from corporals and sergeants at the Basic level through the rank of sergeant major and master gunnery sergeant at the Senior level.

The NCO Basic course is currently taught in residence at 17 Basic schools. The local command hosting the course determines how the available slots in the course are to be distributed among individual units. The unit commander has the responsibility for selecting the NCOs to fulfill the unit's quota. Unit quotas for the resident Career course are assigned by the Commandant of the Marine Corps. The selection of individuals to satisfy the quota is again subject to the discretion of the unit commander.

It is also possible to complete the Basic course via a correspondence course administered by the Marine Corps Institute. The Basic correspondence course is titled "The Marine NCO" and is required of all corporals (E-4) and sergeants (E-5) who have not completed the resident course. A correspondence course is also available at the Career level. This course is mandatory for all staff sergeant selectees and staff sergeants (E-6) who have not completed the resident course. In addition, Resident Instruction Teams (RITs) travel to some host commands to conduct sessions to supplement the material presented in the nonresident Career course.

The Advanced and Senior courses are taught in residence at Quantico. Neither course is required, but they are targeted toward specific pay grades. The Advanced course is intended for first sergeants, master sergeants, and selectees to that grade (E-8). The Senior-level course is designed for sergeants major, master gunnery sergeants, and selectees to that grade (E-9). Selection decisions for the Advanced course are made by the Commandant of the Marine Corps from a pool of certified applicants. In the case of the Senior course, the commanding general of the Marine Corps Development and Education Command (MCDEC) is responsible for selecting students from prioritized lists of nominees submitted by unit commanders.

The data sources used in the analysis of PME selection are discussed in the next section. A model of the factors that influence selection is subsequently developed and estimated. Survey evidence on the type of performer selected into each of the courses is then presented and contrasted with results from the selection model. The frequencies of responses are used to make inferences as to the relative effectiveness of training different types of performers in a given course. The final section summarizes the main conclusions from the analysis.

## DATA

To ascertain what factors, if any, determine selection into the PME resident courses, it was necessary to combine data from a variety of sources. Available rosters of former PME students from 1981 through 1986 were merged with training and demographic information from the March 1986 Headquarters Master File (HMF) and performance data from one of two sources. In the case of corporals, performance was measured by proficiency marks from the Proficiency/Conduct (PRO/CON) reports. For Marines of rank sergeant or above, "general value to the service" was chosen as the measure of performance from their set of Fitness marks. Both sets of marks were rescaled using the relative value scheme described in [2]. Performance measures were created for each year in which data was available using a weighted average approach. For further information on the construction of the performance data, see appendix A.

In July 1986, survey forms were mailed to 2,108 former PME students and 1,995 supervisors. The supervisor survey was used to answer the positive question of how performance actually determines selection into the resident PME courses as well as the normative question of how performance should determine selection. The student surveys addressed only the normative question.

Additional packets of questionnaires were sent in October 1986 to commands that had not yet responded to the survey. By 1 January 1987, only 102 of 199 reporting units had returned any student questionnaires. Similarly, supervisor questionnaires were received from only 96 of 190 units. A total of 624 valid student questionnaires and 732 valid supervisor questionnaires were returned. Relative to the population sampled, the response rate for former PME students is 29.6 percent; the supervisor response rate is 37.1 percent.

It should be noted that the survey response by commands stationed overseas was much lower relative to domestic commands. As a result, the survey findings tend to represent the views of those stationed in the continental United States.

## PME SELECTION MODEL

Table 1 shows the percentage difference in prior performance of those who completed each of the resident courses in 1985 relative to the unselected population of the same pay grade. The percentages are computed using the relative value estimates of performance. The average performance in 1984 of corporals and sergeants in the Basic course and staff sergeants in the Career course is less than that of their unselected counterparts. In the case of the Advanced course, the selected group's performance in the year prior to enrollment is higher relative to the unselected group. The magnitude of each percentage difference is likely to be understated since, because of incomplete student rosters, part of the selected group may be misclassified as unselected.

**TABLE 1**  
**PERCENTAGE DIFFERENCE IN 1984 PERFORMANCE BETWEEN**  
**MARINES SELECTED IN 1985 AND UNSELECTED POPULATION**

Course	Grade	Percentage difference in prior performance <sup>a</sup>	Sample size
Basic	E-4	-3.4%	14,570
Basic	E-5	-5.9	17,182
Career	E-6	-1.9	10,968
Advanced	E-8	1.8	3,162

a. The remainder of the mean prior performance of selected Marines minus the mean prior performance of unselected Marines divided by the mean prior performance of unselected Marines.

Simple percentage differences in prior performance may provide a misleading description of how individuals are selected into the various resident courses. For example, those with longer times in grade may have higher performance marks. If Marines typically take the course earlier in grade, part of the difference in prior performance between the selected and unselected groups would be attributable to differences in time in grade. To isolate the effect of prior performance on selection, a model that controls for other variables that may affect the selection decision is needed.

Since selection into the resident course in a given year can be viewed as a binary choice (i.e., trained versus untrained), a logit model is used to determine the variables which affect PME enrollment. The specification of the model for a given individual,  $i$ , is:

$$PME(t)_i = 1 / [1 + \exp(-\alpha - x_i' \beta)] ,$$

where  $PME(t)_i$  takes on the value of 1 if the previously untrained Marine takes the resident PME course in year  $t$  and 0 if the previously untrained Marine remains untrained in year  $t$ .  $x_i$  is a vector of the characteristics which potentially determine PME selection, and  $\beta$  is a vector of their estimated coefficients. Table 2 provides definitions for each of the independent variables that comprise the  $x$  vector.

**TABLE 2**  
**DEFINITIONS OF INDEPENDENT VARIABLES**

Variable	Definition
RVPERF(t-1)	Average relative value measure of performance in the year before the course (t-1)
SINGLE	1 if never married; 0 otherwise
WHITE	1 if white; 0 otherwise
MALE	1 if male; 0 otherwise
HSG	1 if high school graduate; 0 otherwise
AFQT	Percentile score on Armed Forces Qualifications Test
TIG(t)	Time in grade in year t (number of years)
LES(t)	Length to end of active service in year t (number of years)
LOS(t)	Length of service in year t (number of years)
MOS1	1 if combat; 0 otherwise
MOS2	1 if combat support; 0 otherwise
MOS3	1 if administration and logistics; 0 otherwise
MOS4	1 if technical; 0 otherwise
MOS5	1 if aviation; 0 otherwise



The percentile score on the AFQT and a dummy variable, *HSG*, indicating whether or not the individual has completed high school, are used as measures of ability in the logit equation. When ability is held constant, Marines with lower performance marks have greater room for improvement than higher performers. Assuming that there are not enough slots available for all untrained Marines of a given grade, the Marine Corps might obtain a higher return by providing the resident PME courses to lower performing Marines. On the other hand, prior performance may be a measure of a person's willingness to learn. If lower performers tend to lack the motivation necessary to improve from the training, the Marine Corps may obtain a higher return from those with higher prior performance. The relative value measure of performance in the year before the course, *RVPERF*(*t*-1), is included as an independent variable to examine the effect of prior performance on selection.

The commanders responsible for selecting the students for the resident Basic and Career courses may be acting in the interests of their unit rather than the broader interests of the Marine Corps. To the extent that the unit to which the student is assigned bears the cost of foregone productivity while the benefits of PME training spill over to the Marine Corps as a whole, unit commanders have an incentive to send lower performers to these schools. Such a problem is less likely in the case of the Advanced course, since the selection decision is made by higher authorities in the Marine Corps.

The variable *LOS*(*t*) controls for selection based on overall tenure. It can be viewed in part as an additional measure of prior performance. Marines of a particular grade with greater length of service but the same time in grade will have taken longer to be promoted to that grade, which may imply that they are lower performers. However, some military occupational specialties (MOSs) are faster tracks for promotion than others, this measure may capture variables other than prior performance. To the extent that this measure controls for such MOS-specific effects, it is not possible to anticipate the sign of its coefficient.

The Basic, Career, and Advanced courses are designed to enhance the performance of corporals and sergeants, staff sergeants, and first sergeants and master sergeants, respectively. These courses should be taken early in their respective grades so that the knowledge gained from them can be applied sooner to the Marine's job tasks. As long as PME continues to provide benefits throughout one's tenure in a pay grade, early training in grade provides the Marine Corps with a higher yield on its investment in training. A higher yield is also obtained by training Marines with a longer period of time to the end of their contract. This ensures the Marine Corps a longer stream of benefits from the PME training. Time in grade, *TIG*(*t*), and length to end of active service, *LES*(*t*), test for selection that is consistent with an efficient allocation of a limited number of seats.



The logit equation also tests for differences in selection based on marital status, race, and sex. These differences are captured by the dummy variables, *SINGLE*, *WHITE*, and *MALE*. Five MOS dummy variables are included in the equation to control for occupation. Since the course content of PME is geared toward combat leadership, one might expect selection to be biased in favor of combat specialties.

A separate logit equation was estimated for each of the years 1985 and 1986 for corporals in the Basic course, sergeants in the Basic course, and staff sergeants in the Career course. Selection into the Career course was also analyzed for 1983 and 1984 because there were large samples of trained personnel in these years and performance data in the previous year was more readily available for staff sergeants than for other grades. Because of the absence of any data on first sergeants and master sergeants in the Advanced course in 1986, selection into this course was examined only for 1984 and 1985. A logit equation was not estimated for the Senior course because of the small size of the population trained in any given year.

There is a difference between the specification of the logit equations for the Advanced course and the lower-level PME courses. The percentile score on the AFQT is not included as an independent variable in the equations for the Advanced course because it is often not reported in the HMF. The exclusion of this variable was designed to increase the relatively small sample size of students from this course.

## DETERMINANTS OF SELECTION INTO PME RESIDENT COURSES

Appendix B provides separate means and standard deviations of each variable for the selected and unselected populations. Maximum likelihood estimates of each variable's coefficient in the logit model are presented in appendix C, along with other descriptive statistics.<sup>1</sup> Since the size of the trained population is understated, some of those classified as not having completed PME would have taken it. As a result, differences in the characteristics of the selected versus unselected populations may be understated.

The logit results are summarized by course in table 3. The four equations for the Basic course consist of two equations for corporals (1985, 1986) and two equations for sergeants (1985, 1986). Four equations appear for staff sergeants in the Career course (1983 through 1986), and two equations are used to analyze the selection criteria

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1. The methods used to generate the samples used in appendices B and C differ. An individual for whom data on any of the model's variables is missing is excluded from the logit analysis and descriptive statistics in appendix C. Appendix B includes such an individual in calculating means and standard deviations only for those variables in which data is available.

for master sergeants and first sergeants in the Advanced course (1984, 1985). A plus sign indicates that an increase in the variable has a positive effect on the likelihood of selection at the 10-percent level of significance; a minus sign indicates a negative effect; a zero denotes that the coefficient is not significantly different from zero. Since some equations yield different signs for the same course, the sign in the table indicates the direction of the effect that appears most frequently for the course at the 10-percent level. The number of logit equations with this effect appears in parenthesis following the sign.

**TABLE 3**  
**DETERMINANTS OF PME SELECTION**

Independent variable	Effect on selection							
	Basic course		Career course		Advanced course		Overall	
RVPERF(t - 1)	-	(3)	-	(3)	+	(1)	-	(6)
SINGLE	0	(3)	0	(4)	0	(2)	0	(9)
WHITE	-	(2)	-	(2)	-	(1)	-	(5)
MALE	-	(2)	0	(4)	0	(2)	0	(8)
HSG	0	(4)	0	(3)	+	(1)	0	(8)
AFQT	0	(4)	0	(3)	NA		0	(7)
TIG(t)	-	(3)	-	(4)	-	(1)	-	(8)
LES(t)	+	(2)	0	(3)	+	(2)	+	(5)
LOS(t)	-	(3)	0	(3)	0	(2)	0	(6)
MOS1	-	(2)	0	(3)	+	(1)	0	(5)
MOS2	0	(4)	0	(4)	0	(2)	0	(10)
MOS3	0	(3)	-	(3)	-	(1)	-	(5)
MOS4	-	(4)	0	(4)	0	(2)	0	(6)
MOS5	-	(3)	-	(4)	-	(1)	-	(8)
Total number of equations		4		4		2		10

NOTE: The numbers in parentheses are the number of logit equations with this effect at the 10-percent level of significance.

Lower performers are more likely to be selected into the Basic and Career courses, whereas higher performers seem slightly more likely to be chosen for the Advanced course. In 3 of 4 equations involving the Basic course, prior performance has a significant negative effect on selection at the 1-percent level. At the same level of significance, those with higher performance marks in the previous year are less likely to take the Career course in 3 of 4 years. In contrast, higher performers are significantly more likely to take the Advanced course in 1 of 2 years at the 10-percent level.

Relative to untrained Marines in the same grade, those who are selected for PME training tend to have less time in grade. In each equation, at the 1-percent level of significance, time in grade has a negative effect on the selection of sergeants into the Basic course and staff sergeants into the Career course. A similar effect is obtained at the 1-percent level for corporals selected into the Basic course in 1 of 2 years, and at the 5-percent level for first sergeants and master sergeants chosen for the Advanced course in 1 of 2 years. These results are consistent with an efficient allocation of limited training resources.

At the 5-percent significance level, Marines with greater length to the end of their active service are more likely to be selected in 1 of 4 cases for the Basic course, 1 of 4 cases for the Career course, and 2 of 2 cases for the Advanced course. Measurement error in this variable for earlier time periods may account for its weak influence on the selection decision. Since length to end of active service is constructed from information on a person's contract in 1986, it would not be a true measure of the time left on an earlier contract in a previous year if the contract had been subsequently extended or renewed. Random error in measuring length to end of active service in earlier years is consistent with the fact that 2 of 3 equations in 1986 yield a significantly positive effect for this variable at the 1-percent level, whereas only 1 of 7 equations yield a similar result in previous years.

In a majority of equations, the effects of education, tenure, marital status, AFQT scores, and gender on selection are statistically insignificant at the 10-percent level. Whites are significantly less likely to take PME relative to nonwhites in half of the equations. Three of the five military-occupational-specialty (MOS) variables are insignificant in most cases. The two exceptions are administration and logistics (5 of 10 cases) and aviation (8 of 10 cases). Marines in these two groups are less likely to receive PME training.

## **SURVEY RESULTS**

The main purpose of the supervisor survey was to assess the role of prior performance in selecting Marines for the PME courses. The surveys were designed to

answer the positive question of what type of performer is sent to the PME schools as well as the normative question of what type of performer ought to be sent to the PME school to generate a net benefit to the unit. The reasons for selection of a particular type of performer were also solicited from supervisors for each course. If the size of the benefit is larger for one type of performer relative to another in a given course, one would expect a higher percentage of supervisors to perceive a benefit from that type of performer relative to the other type. The relative magnitude of the proportion who perceive a positive benefit can thereby serve as a proxy measure for the relative size of the benefit. Finally, the supervisor survey examines the extent to which operational commitments keep units away from their garrisons. If a unit is not stationed at its garrison for at least part of the preceding year, its supervisors are asked to evaluate the effect of these commitments on the ability of eligible personnel to take the resident courses.

## PERFORMANCE CRITERIA

Table 4 shows how supervisors responded to the question of what type of performer they would send to each course. The choices were "best," "average," and "marginal." By restricting supervisors to a single choice, the question is designed to obtain information on which type of performer they are most inclined to send. For the Basic and Career courses, a majority of respondents (60.9 percent and 60.2 percent, respectively) favor the average performer. In contrast, the best performer is chosen by 58.9 percent and 69.5 percent of the respondents for the Advanced and Senior courses respectively.

Describing performers as best, average, and marginal is somewhat ambiguous, since different respondents may be evaluating Marines relative to different reference populations. For example, a given student in the Career course may be viewed as a marginal performer relative to other staff sergeants and as an average performer relative to all noncommissioned Marines. If respondents tend to treat all noncommissioned Marines as the reference group, then the survey may be showing that better performers are more likely to be in higher pay grades. This would explain why the logit results find the typical selectee for the Basic and Career courses less than average relative to other Marines of the same pay grade, but the survey respondents view the typical performer as "average." Alternatively, the respondents to the supervisor survey may tend to use Marines of the grade(s) eligible for the training as the reference population. To reconcile the logit and survey results for the Basic and Career courses, one might then argue that supervisors correctly perceive that the selectees are less than average performers, but they are closer to being average performers than marginal performers.

**TABLE 4**  
**SUPERVISORS' PERFORMANCE CRITERIA IN PME SELECTION**

Q: Indicate the type of performer you would send to each of the following resident PME courses by checking one response for each course.

Type of performer	Basic	Career	Advanced	Senior
Best	21.3%	33.7%	58.9%	69.5%
Average	60.9	60.2	37.7	27.6
Marginal	<u>17.7</u>	<u>6.1</u>	<u>3.4</u>	<u>2.9</u>
	100.0%	100.0%	100.0%	100.0%
Number responding	717	709	552	475

NOTE: The denominator used in calculating each percentage is the number responding to a particular course.

SOURCE: PME Supervisor Survey.

Supervisors were also asked to indicate the reasons for sending various types of performers to each of the PME courses. Tables 5 through 7 present the percentage of respondents who cited a particular reason for a given type of performer in a given course. Note that the sum of the percentages in a given column exceed 100 percent. In contrast to the previous question, respondents were allowed to choose more than one reason for sending a specific type of performer to a particular course.

For each type of performer in the Basic, Career, and Advanced courses, the two most popular reasons are that PME benefits the unit and that it benefits the NCO. With respect to best performers, there is no difference between the proportions expressing these two views for each of the courses. However, for either average or marginal performers, the proportion who believe that PME benefits the unit is about 10 percentage points lower than the proportion who believe that PME benefits the NCO. These differences suggest that the benefits of PME to average and marginal performers exceed the benefits accruing to the unit.



**TABLE 5****SUPERVISORS' REASONS FOR SELECTION INTO THE BASIC COURSE**

Q: Indicate the reason that you would send each of the following types of performers to the Basic resident course. Check as many responses as are appropriate for each level of performance.

<b>Reason for selection</b>	<b>Best performer</b>	<b>Average performer</b>	<b>Marginal performer</b>
Benefit unit	79.4%	78.3%	57.3%
Benefit NCO	79.4%	89.1%	69.9%
Cannot spare best NCO	4.7%	12.1%	6.0%
Do not have better performer	4.9%	11.1%	8.6%
Do not have poorer performer	5.2%	7.7%	5.3%
Send whoever is available	13.1%	22.7%	18.0%
Remedial training	3.3%	18.0%	40.3%
No benefit anticipated (would not send)	6.9%	0.5%	14.5%
Other	2.9%	2.9%	2.8%
Number responding	613	660	571

NOTE: The denominator used in calculating each percentage is the number responding for a particular type of performer.

SOURCE: PME Supervisor Survey.

**TABLE 6**

**SUPERVISORS' REASONS FOR SELECTION INTO THE CAREER COURSE**

Q: Indicate the reason that you would send each of the following types of performers to the Career resident course. Check as many responses as are appropriate for each level of performance.

<b>Reason for selection</b>	<b>Best performer</b>	<b>Average performer</b>	<b>Marginal performer</b>
Benefit unit	84.3%	79.5%	51.4%
Benefit NCO	84.1%	88.8%	60.4%
Cannot spare best NCO	3.6%	12.1%	6.4%
Do not have better performer	7.0%	11.2%	7.3%
Do not have poorer performer	4.7%	6.4%	5.4%
Send whoever is available	12.8%	19.4%	13.1%
Remedial training	3.1%	16.8%	31.4%
No benefit anticipated (would not send)	2.3%	0.5%	24.7%
Other	3.7%	3.1%	2.6%
Number Responding	616	643	535

NOTE: The denominator used in calculating each percentage is the number responding to a particular type of performer.

SOURCE: PME Supervisor Survey.

**TABLE 7**

**SUPERVISORS' REASONS FOR SELECTION INTO THE ADVANCED COURSE**

Q: Indicate the reason that you would send each of the following types of performers to the Advanced resident course. Check as many responses as are appropriate for each level of performance.

<b>Reason for selection</b>	<b>Best performer</b>	<b>Average performer</b>	<b>Marginal performer</b>
Benefit unit	87.7%	76.5%	43.6%
Benefit NCO	84.3%	85.5%	52.3%
Cannot spare best NCO	3.6%	12.4%	6.0%
Do not have better performer	6.3%	12.8%	6.5%
Do not have poorer performer	4.4%	4.4%	4.8%
Send whoever is available	13.1%	17.2%	12.5%
Remedial training	2.6%	14.7%	24.5%
No benefit anticipated (would not send)	2.0%	4.0%	34.1%
Other	3.4%	3.2%	3.6%
Number Responding	504	476	417

NOTE: The denominator used in calculating each percentage is the number responding to a particular type of performer.

SOURCE: PME Supervisor Survey.

The proportion of supervisors who perceive a benefit from PME training either to the unit or to the NCO is over 20 percentage points lower for marginal performers than average performers. Two other responses receive greater support in the case of marginal performers. Remedial training was given as a reason for the Basic course for marginal performers by 40.3 percent of the respondents, whereas only 18.8 percent of respondents gave remedial training as a justification for the Basic course for average



performers. Second, 14.5 percent of respondents would not send marginal performers to the Basic course because they do not anticipate any benefit, but only 0.5 percent fail to perceive any benefit to average performers from this course. The relative importance of these two responses differs for marginal performers across the three courses. The "remedial training" response diminishes in importance as the course level changes from Basic to Career to Advanced. In contrast, the "no benefit" answer occurs more frequently as the course level increases.

The reasons given by supervisors for PME selection suggest that training of average and best performers is beneficial to the Marine Corps. The greater percentage of supervisors who fail to observe any benefit in training marginal performers relative to better performers indicates that PME is less effective for marginal performers. Additional survey evidence as to the effectiveness of the PME courses for different types of performers is presented in tables 8 and 9. In table 8, former students were asked what types of performers would benefit from PME. Table 9 presents the responses of supervisors who were asked to compare the benefits to the unit of the training in relation to the largest cost associated with training: the loss of the NCO's services to the unit during the course.

**TABLE 8**  
**STUDENTS' PERCEPTIONS OF THE VALUE OF PME TRAINING**  
**TO THE NCO**

Q: Indicate the types of NCOs who would benefit from PME. Check as many responses as are appropriate for each PME course.

Type of performer	Basic	Career	Advanced	Senior
Best performer	85.0%	83.6%	97.0%	92.0%
Marginal performer	93.1%	79.8%	76.4%	60.0%
Any NCO	79.3%	63.3%	73.5%	52.0%
None	1.2%	0.0%	0.0%	0.0%
Number responding	421	79	34	25

NOTE: The denominator used in calculating each percentage is the number responding to a particular course.

SOURCE: PME Student Survey.

**TABLE 9**  
**SUPERVISORS' PERCEPTIONS OF THE NET VALUE**  
**OF PME TRAINING TO THE UNIT**

Q: Indicate the types of NCOs for whom you think the improved performance resulting from a resident PME course would be worth (or exceed) the loss of the NCO's services to the unit during the course. Check as many responses as are appropriate for each PME course.

Type of performer	Basic	Career	Advanced	Senior
Top performer	67.9%	68.3%	75.9%	84.0%
Average performer	73.9%	84.7%	68.9%	58.3%
Marginal performer	67.4%	48.0%	33.0%	31.6%
Any NCO	50.2%	34.9%	25.4%	26.2%
None (benefit not worth loss)	0.8%	0.4%	2.0%	3.0%
Number responding	709	703	552	465

NOTE: The denominator used in calculating each percentage is the number responding to a particular course.

SOURCE: PME Supervisor Survey.

Table 8 shows that only 1.2 percent of the students from the Basic course believe PME had no effect on the performance of all types of Marines. For the other courses, all of the respondents found a positive effect for at least one type of performer. Similarly, table 9 shows that less than 1 percent of the supervisors found that the Basic and Career courses would not yield any benefit to their units for any type of Marine. For the Advanced and Senior courses, only 2 and 3 percent of the respondents expressed that view. These results clearly show that both students and supervisors believe that PME training is beneficial to the Marine Corps.

A majority of students from each course believe that PME would benefit any NCO. The proportion expressing this view ranges from 52 percent for the Senior course to 79.3 percent for the Basic course. Of the supervisors, 50.2 percent believe that any NCO's participation in the Basic course would provide a net benefit to the unit.

Less than a majority hold such a view for the Career, Advanced, and Senior courses. The fact that the proportions expressing a positive response for the "any NCO" category are smaller for each course in the supervisor survey than in the student survey can be easily explained. The students were asked whether PME yields any benefits to themselves. In contrast, supervisors were not instructed to consider benefits that accrue to the Marine Corps as a whole that are external to the particular unit. If PME provides benefits throughout an individual's service career, the unit will only receive benefits for the period in which the Marine is assigned to it. In addition, the students were not explicitly asked to consider any costs in evaluating the training. Only the supervisors were instructed to deduct the cost of the student's foregone services during the training from the unit's benefits.

The number of students who believe that marginal performers benefit from the Basic course is greater than those who believe that best performers benefit from the same course. The reverse is the case for the Career, Advanced, and Senior courses. The difference between the percentage of students who find any benefit to best performers and the percentage who find any benefit to marginal performers increases with the level of the course. To the extent that these relative proportions serve as a proxy for the relative magnitudes of the benefits associated with these courses, it would appear that the higher the level of the course, the larger the benefit to best performers relative to marginal performers.

In the supervisor survey, a similar relationship exists between the course level and the type of performer. Supervisors were asked to consider whether the improved performance from each of the courses would be worth the loss of the services of top, average, and marginal performers. A majority of the respondents believe that the selection of top performers to each of the four courses benefits the unit. A majority also feel that average performers generate benefits for the unit from each of the courses. However, the percentage for top performers is smaller relative to average performers for the Basic and Career courses, whereas it is larger for top performers relative to average performers for the Advanced and Senior courses. For marginal performers, a majority of the supervisors believe that PME benefits the unit only in the case of the Basic course. As the course level rises, the percentage who find that PME generates a net benefit to the unit diminishes for marginal performers and increases for top performers. If these relative proportions are a good proxy for the relative magnitudes of the benefits, then the higher the level of the course, the smaller the unit's net benefit from training marginal performers and the higher the unit's net benefit from training top performers.

## **OPERATIONAL COMMITMENTS**

Table 10 indicates the extent to which operational commitments reduce the amount of time a unit spends annually at its garrison. Almost half of the supervisors

belong to units that did not leave their garrisons. The median response is that the unit was away from its garrison 3 percent of the time. Of the respondents, 12.1 percent spent more than 40 percent of their time at other locations; only 0.4 percent of the sample were away from their garrison more than 80 percent of the time. Although these percentages indicate that most units spend most of their time at their garrison, a few units are deployed for a large percentage of the time in a given year.

**TABLE 10**  
**OPERATIONAL COMMITMENTS OF THE UNIT**

Q: Indicate the percent of time that your unit was away from garrison during the past 12 months.

Percent of time away from garrison	Percent of respondents	Cumulative percent of respondents
0%	48.6%	48.6%
1-20	23.2	71.8
21-40	16.1	87.9
41-60	8.6	96.5
61-80	3.1	99.6
81-100	0.4	100.0

Number responding: 490

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SOURCE: PME Supervisor Survey.

Supervisors whose units spent at least part of the time away from their garrison were asked to assess the impact of these operational commitments on their subordinates' opportunities for attending the Basic and Career schools. In tables 11 and 12, the responses are cross-tabulated by the percentage of time that their units spent away from their garrison. In units away from their garrison from 1 to 20 percent of the time, a majority of the respondents for each course observe no effect of operational commitments on enrollment. As the amount of time spent away from the garrison increases beyond 20 percent, the percentage of supervisors who find no effect on enrollment diminishes for each course.

The use of correspondence courses is the most popular response to operational commitments that keep units away from their garrison more than 40 percent of the time.

The second and third most frequently cited options of these units are (respectively) that the quotas are filled with whoever is available and that the quotas could not be satisfied. Each of these three responses is chosen more often by members of units that spent more than 40 percent of their time away from their base than those who were away 40 percent or less of the time.

**TABLE 11**  
**EFFECT OF OPERATIONAL COMMITMENTS ON ENROLLMENT**  
**IN THE BASIC COURSE**

Q: Indicate the effect of your unit's operational commitments on the level of enrollment in the Basic course while your unit was away from garrison during the past 12 months. Check as many responses as are appropriate.

Percent of time away from garrison:	1-20%	21-40%	41-100%
Number responding:	135	91	66

Effect on enrollment	Percent of respondents		
None	59.3%	28.6%	15.2%
Could not fill quota	13.3	16.5	28.8
Sent best performers	14.1	28.6	25.8
Sent marginal performers	7.4	22.0	19.7
Filled quota with whoever available	20.0	33.0	50.0
Had NCOs take correspondence course	28.9	53.8	60.6

NOTE: The denominator used in calculating each percentage is the number responding to a particular range of "percent of time away from garrison."

SOURCE: PME Supervisor Survey.

Table 12 also indicates that Resident Instruction Teams (RITs) are used rather infrequently to supplement material presented in the Career correspondence course. Regardless of the level of operational commitments, RIT training is clearly the least popular response.

**TABLE 12**  
**EFFECT OF OPERATIONAL COMMITMENTS ON ENROLLMENT**  
**IN THE CAREER COURSE**

Q: Indicate the effect of your unit's operational commitments on the level of enrollment in the Career course while your unit was away from garrison during the past 12 months. Check as many responses as are appropriate.

Percent of time away from garrison:	1-20%	21-40%	41-100%
Number responding:	128	94	68

Effect on enrollment	Percent of respondents		
None	53.9%	28.7%	16.2%
Could not fill quota	13.3	22.3	26.5
Sent best performers	14.8	30.9	20.6
Sent marginal performers	7.0	17.0	11.8
Filled quota with whoever available	16.4	31.9	39.7
Requested RIT to teach course	6.3	5.3	4.4
Had NCOs take correspondence course	25.0	35.1	44.1

NOTE: The denominator used in calculating each percentage is the number responding to a particular range of "percent of time away from garrison."

SOURCE: PME Supervisor Survey.

## SUMMARY

The process of selecting noncommissioned officers of a particular pay grade for resident PME training is not random. A logit model of the selection decision was estimated for each relevant pay grade in the Basic, Career, and Advanced courses. The prior performance marks of students in the Basic and Career courses were shown to be significantly lower than those of Marines of the same grade who were not selected. Some evidence was also presented to support the hypothesis that the prior performance marks of selectees to the Advanced course are higher than those of unselected Marines of the same pay grade.

The main reasons for choosing Marines for PME training are that the training benefits the students and it benefits their units. For each of the resident PME courses,



supervisors generally perceive that the gain in performance from the training is worth (or exceeds) the loss of the services of average or top performers to the unit during the course. For marginal performers, this view is held by a majority of supervisors only in the case of the Basic course.

To compare the relative benefits of training different types of performers, it was assumed that the higher the percentage of respondents who observed any benefit, the larger the magnitude of these benefits. The supervisor survey suggests that units benefit the most from training average performers in the Basic and Career courses and top performers in the Advanced and Senior courses. The net benefit to the unit of training top performers rather than marginal performers increases with the level of the course.

Almost half of the supervisors are assigned to units that spend no time away from their garrison. However, as operational commitments outside the garrison increase, the availability of resident training at the Basic and Career level is reduced. Units typically respond to this problem by having their personnel take correspondence courses and filling quotas with whoever is available. Almost 20 percent of the supervisors whose units spend any time away from their garrison could not fill their quota as a result of their operational commitments.

The logit analysis also demonstrates that those who receive PME training tend to have less time in grade and more time to the end of their contract than unselected Marines of the same pay grade. Early training in grade is an efficient screening device for allocating a limited number of training opportunities to a large eligible population. Providing training to those with more time left on their contract is desirable for the same reason. Education, length of service, marital status, AFQT scores, and gender generally have no effect on the selection decision.

## **REFERENCES**

- [1] MCO 1510.27B, "Professional Military Education System for Noncommissioned and Staff Noncommissioned Officers," 21 Jun 1984
- [2] CNA Research Contribution 550, "The Translation of Supervisory Ratings into Measurements of Relative Value," by Laurie J. May, Unclassified, Jul 1986



## **APPENDIX A**

### **TRANSLATION OF PERFORMANCE MARKS INTO RELATIVE-VALUE MARKS**

## **APPENDIX A**

### **TRANSLATION OF PERFORMANCE MARKS INTO RELATIVE-VALUE MARKS**

The relative-value scale provides an estimate of the percentage difference in performance between Marines who receive adjacent proficiency or fitness marks. The scale was developed in [A-1] from a survey of 258 Marine Corps captains and majors. The officers were asked to estimate the percentage difference in “value to the Marine Corps” between adjacent marks. The average responses of the officers were used in translating proficiency and fitness marks into measures of relative value.

**TABLE A-1**  
**TRANSLATION OF PERFORMANCE MARKS**  
**INTO RELATIVE-VALUE MARKS**

<b>Proficiency mark</b>	<b>Relative-value translation</b>	<b>Fitness mark</b>	<b>Relative-value translation</b>
5.0	9.087	9.0	5.685
4.9	7.655	8.0	4.459
4.8	6.565	7.0	3.489
4.7	5.635	6.0	2.694
4.6	4.829	5.0	2.217
4.5	4.192	4.0	1.885
4.4	3.586	3.0	1.610
4.3	3.176	2.0	1.314
4.2	2.872	1.0	1.131
4.1	2.618	0.0	1
4.0	2.395		
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.			
3.5	1.802		
2.5	1.444		
1.5	1.231		
0.5	1		

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SOURCE: [A-1], p. 20.

## **REFERENCE**

- [A-1] CNA Research Contribution 550, "The Translation of Supervisory Ratings into Measurements of Relative Value," by Laurie J. May, Unclassified, Jul 1986

**APPENDIX B**

**DESCRIPTIVE STATISTICS**

## **APPENDIX B**

### **DESCRIPTIVE STATISTICS**

The mean, standard deviation, and number of observations for each independent variable are shown in tables B-1 through B-10. These statistics are computed separately by pay grade, year, and selected versus unselected population.

**TABLE B-1**  
**DESCRIPTIVE STATISTICS FOR CORPORALS BY PME(85)**

Independent variable	PME(85)=1		PME(85)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(84)	1,767	4.93 (1.07)	12,803	5.10 (1.10)
SINGLE	2,104	.48 (.50)	15,165	.47 (.50)
WHITE	2,106	.71 (.46)	15,198	.73 (.44)
MALE	2,106	.93 (.26)	15,198	.93 (.25)
HSG	2,106	.93 (.25)	15,188	.92 (.27)
AFQT	2,104	52.4 (26.0)	15,163	52.5 (25.7)
TIG(85)	2,106	.81 (.72)	15,198	.92 (.77)
LES(85)	2,104	3.22 (1.47)	15,120	3.14 (1.53)
LOS(85)	2,106	3.05 (1.26)	15,198	3.37 (1.32)
MOS1	2,106	.24 (.43)	15,198	.18 (.39)
MOS2	2,106	.26 (.44)	15,198	.22 (.41)
MOS3	2,106	.14 (.34)	15,198	.17 (.38)
MOS4	2,106	.12 (.32)	15,198	.14 (.34)
MOS5	2,106	.09 (.29)	15,198	.15 (.36)

**TABLE B-2**  
**DESCRIPTIVE STATISTICS FOR CORPORALS BY PME(86)**

Independent variable	PME(86)=1		PME(86)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(85)	1,642	5.19 (1.12)	26,764	5.22 (1.12)
SINGLE	1,785	.57 (.50)	29,875	.55 (.50)
WHITE	1,794	.73 (.44)	30,097	.76 (.43)
MALE	1,794	.93 (.26)	30,097	.94 (.25)
HSG	1,792	.95 (.21)	30,047	.94 (.24)
AFQT	1,793	56.2 (24.7)	30,031	54.7 (24.8)
TIG(86)	1,794	.96 (.81)	30,097	1.16 (.93)
LES(86)	1,794	2.49 (1.41)	29,989	2.03 (1.50)
LOS(86)	1,794	3.27 (1.35)	30,097	3.74 (1.42)
MOS1	1,794	.19 (.39)	30,097	.24 (.42)
MOS2	1,794	.21 (.41)	30,097	.20 (.40)
MOS3	1,794	.17 (.38)	30,097	.15 (.36)
MOS4	1,794	.14 (.32)	30,097	.14 (.34)
MOS5	1,794	.12 (.32)	30,097	.14 (.34)



**TABLE B-3**  
**DESCRIPTIVE STATISTICS FOR SERGEANTS BY PME(85)**

Independent variable	PME(85)=1		PME(85)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(84)	509	4.19 (.92)	16,673	4.45 (.88)
SINGLE	999	.30 (.46)	21,344	.24 (.43)
WHITE	999	.68 (.47)	21,344	.70 (.46)
MALE	999	.91 (.29)	21,344	.93 (.26)
HSG	999	.93 (.25)	21,344	.90 (.30)
AFQT	811	56.2 (23.3)	15,786	55.3 (23.0)
TIG(85)	999	1.22 (1.22)	21,344	2.23 (1.60)
LES(85)	995	3.33 (1.48)	21,180	3.28 (1.45)
LOS(85)	998	4.88 (1.85)	21,332	5.92 (1.91)
MOS1	999	.19 (.39)	21,344	.16 (.36)
MOS2	999	.20 (.40)	21,344	.18 (.39)
MOS3	999	.19 (.39)	21,344	.19 (.39)
MOS4	999	.14 (.35)	21,344	.16 (.37)
MOS5	999	.09 (.29)	21,344	.15 (.36)

TABLE B-4

## DESCRIPTIVE STATISTICS FOR SERGEANTS BY PME(86)

Independent variable	PME(86)=1		PME(86)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(85)	209	4.30 (.90)	16,766	4.55 (.94)
SINGLE	339	.33 (.47)	21,419	.25 (.43)
WHITE	339	.65 (.48)	21,419	.70 (.46)
MALE	339	.89 (.31)	21,419	.93 (.26)
HSG	339	.91 (.29)	21,419	.90 (.30)
AFQT	277	54.3 (22.3)	15,933	55.5 (23.0)
TIG(86)	339	2.08 (1.37)	21,419	3.03 (1.65)
LES(86)	339	2.40 (1.29)	21,251	2.27 (1.44)
LOS(86)	339	5.95 (1.79)	21,417	6.80 (1.95)
MOS1	339	.12 (.33)	21,419	.17 (.37)
MOS2	339	.19 (.39)	21,419	.18 (.38)
MOS3	339	.20 (.40)	21,419	.19 (.39)
MOS4	339	.17 (.38)	21,419	.16 (.37)
MOS5	339	.11 (.31)	21,419	.15 (.36)

**TABLE B-5**  
**DESCRIPTIVE STATISTICS FOR STAFF SERGEANTS BY PME(83)**

Independent variable	PME(83)=1		PME(83)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(82)	957	4.40 (.81)	10,020	4.49 (.84)
SINGLE	963	.09 (.28)	10,126	.07 (.26)
WHITE	963	.69 (.46)	10,126	.77 (.42)
MALE	963	.97 (.17)	10,126	.97 (.17)
HSG	963	.87 (.34)	10,126	.83 (.38)
AFQT	721	59.4 (19.5)	7,283	59.2 (20.2)
TIG(83)	963	1.71 (1.27)	10,126	2.66 (2.21)
LES(83)	961	5.38 (1.51)	10,067	5.38 (1.47)
LOS(83)	963	8.32 (1.83)	10,110	9.19 (2.49)
MOS1	963	.16 (.37)	10,126	.13 (.33)
MOS2	963	.18 (.39)	10,126	.17 (.38)
MOS3	963	.17 (.38)	10,126	.20 (.40)
MOS4	963	.17 (.37)	10,126	.14 (.35)
MOS5	963	.15 (.35)	10,126	.20 (.40)

**TABLE B-6**  
**DESCRIPTIVE STATISTICS FOR STAFF SERGEANTS BY PME(84)**

Independent variable	PME(84)=1		PME(84)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(83)	1,280	4.54 (.82)	9,988	4.54 (.85)
SINGLE	1,286	.09 (.29)	10,103	.08 (.28)
WHITE	1,286	.71 (.45)	10,103	.76 (.43)
MALE	1,286	.96 (.19)	10,103	.97 (.18)
HSG	1,286	.87 (.34)	10,103	.83 (.37)
AFQT	937	57.4 (20.5)	7,066	58.8 (20.6)
TIG(84)	1,286	1.63 (1.29)	10,103	2.85 (2.31)
LES(84)	1,278	4.44 (1.48)	10,047	4.39 (1.48)
LOS(84)	1,286	8.36 (1.71)	10,093	9.55 (2.57)
MOS1	1,286	.15 (.36)	10,103	.13 (.33)
MOS2	1,286	.19 (.39)	10,103	.16 (.37)
MOS3	1,286	.16 (.37)	10,103	.20 (.40)
MOS4	1,286	.15 (.36)	10,103	.15 (.35)
MOS5	1,286	.17 (.37)	10,103	.20 (.40)

**TABLE B-7**  
**DESCRIPTIVE STATISTICS FOR STAFF SERGEANTS BY PME(85)**

Independent variable	PME(85)=1		PME(85)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(84)	1,343	4.54 (.85)	9,625	4.63 (.84)
SINGLE	1,362	.11 (.31)	9,770	.10 (.29)
WHITE	1,362	.70 (.46)	9,770	.76 (.43)
MALE	1,362	.97 (.18)	9,770	.96 (.20)
HSG	1,362	.87 (.34)	9,770	.84 (.36)
AFQT	916	55.0 (21.5)	6,674	58.8 (21.0)
TIG(85)	1,362	1.89 (1.46)	9,770	3.18 (2.43)
LES(85)	1,362	3.48 (1.44)	9,711	3.40 (1.51)
LOS(85)	1,362	8.89 (1.70)	9,765	10.05 (2.67)
MOS1	1,362	.18 (.38)	9,770	.11 (.32)
MOS2	1,362	.19 (.39)	9,770	.16 (.37)
MOS3	1,362	.15 (.35)	9,770	.20 (.40)
MOS4	1,362	.16 (.37)	9,770	.15 (.36)
MOS5	1,362	.15 (.35)	9,770	.21 (.41)

**TABLE B-8**  
**DESCRIPTIVE STATISTICS FOR STAFF SERGEANTS BY PME(86)**

Independent variable	PME(86)=1		PME(86)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(85)	373	4.70 (.92)	9,071	4.71 (.94)
SINGLE	394	.14 (.34)	9,679	.10 (.30)
WHITE	394	.70 (.46)	9,679	.76 (.43)
MALE	394	.96 (.20)	9,679	.96 (.20)
HSG	394	.87 (.33)	9,679	.85 (.36)
AFQT	270	55.3 (21.5)	6,705	59.0 (21.0)
TIG(86)	394	2.36 (1.55)	9,679	3.88 (2.44)
LES(86)	394	2.71 (1.50)	9,614	2.39 (1.51)
LOS(86)	394	9.49 (1.90)	9,679	10.83 (2.69)
MOS1	394	.16 (.36)	9,679	.11 (.32)
MOS2	394	.21 (.41)	9,679	.16 (.37)
MOS3	394	.18 (.39)	9,679	.19 (.39)
MOS4	394	.15 (.36)	9,679	.17 (.37)
MOS5	394	.13 (.33)	9,679	.21 (.41)

**TABLE B-9**  
**DESCRIPTIVE STATISTICS FOR FIRST SERGEANTS**  
**AND MASTER SERGEANTS BY PME(84)**

Independent variable	PME(84)=1		PME(84)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(83)	200	5.33 (.52)	2,710	5.12 (.69)
SINGLE	200	.05 (.21)	2,750	.02 (.14)
WHITE	200	.78 (.42)	2,750	.83 (.37)
MALE	200	.98 (.14)	2,750	.99 (.09)
HSG	200	.78 (.42)	2,750	.76 (.43)
AFQT	126	51.3 (21.4)	1,416	60.8 (21.9)
TIG(84)	200	1.10 (1.15)	2,750	2.12 (1.75)
LES(84)	198	4.14 (1.34)	2,720	3.71 (1.16)
LOS(84)	200	17.49 (2.50)	2,750	18.77 (2.77)
MOS1	200	.08 (.27)	2,750	.06 (.24)
MOS2	200	.03 (.16)	2,750	.17 (.37)
MOS3	200	.03 (.17)	2,750	.15 (.36)
MOS4	200	.04 (.20)	2,750	.15 (.36)
MOS5	200	.01 (.10)	2,750	.15 (.36)

**TABLE B-10**  
**DESCRIPTIVE STATISTICS FOR FIRST SERGEANTS**  
**AND MASTER SERGEANTS BY PME(85)**

Independent variable	PME(85)=1		PME(85)=0	
	Number of observations	Mean (SD)	Number of observations	Mean (SD)
RVPERF(84)	153	5.27 (.59)	3,009	5.17 (.66)
SINGLE	157	.04 (.19)	3,053	.02 (.14)
WHITE	157	.69 (.46)	3,053	.84 (.37)
MALE	157	.97 (.16)	3,053	.99 (.10)
HSG	157	.78 (.42)	3,053	.77 (.42)
AFQT	105	52.7 (22.0)	1,765	60.0 (22.3)
TIG(85)	157	1.38 (1.34)	3,053	2.26 (1.73)
LES(85)	156	3.23 (1.23)	3,023	2.78 (1.17)
LOS(85)	157	18.08 (2.36)	3,053	19.03 (2.62)
MOS1	157	.10 (.29)	3,053	.07 (.26)
MOS2	157	.11 (.32)	3,053	.17 (.38)
MOS3	157	.04 (.19)	3,053	.17 (.38)
MOS4	157	.08 (.27)	3,053	.16 (.36)
MOS5	157	.03 (.16)	3,053	.16 (.37)



## **APPENDIX C**

### **LOGIT RESULTS FOR PME SELECTION MODEL**

## **APPENDIX C**

### **LOGIT RESULTS FOR PME SELECTION MODEL**

Tables C-1 through C-4, respectively, provide results from the PME selection model for corporals in the Basic course, sergeants in the Basic course, staff sergeants in the Career course, and master and first sergeants in the Advanced course. Levels of significance are designated in the following manner: \* indicates significance at the 1-percent level; \*\* indicates significance at the 5-percent level; \*\*\* indicates significance at the 10-percent level.

TABLE C-1

LOGIT RESULTS ON SELECTION OF CORPORALS INTO  
THE BASIC COURSE

Dependent variable for each model: PME(t)

Independent variable	t=1985		t=1986	
	Mean (SD)	Coefficient (t statistic)	Mean (SD)	Coefficient (t statistic)
INTERCEPT		-.64** (-2.44)		-1.91* (-6.93)
RVPERF(t - 1)	5.11 (1.10)	-.10* (-3.66)	5.24 (1.11)	.02 (.82)
SINGLE	.49 (.50)	-.04 (-.70)	.57 (.49)	-.03 (-.60)
WHITE	.74 (.44)	-.23* (-3.61)	.77 (.42)	-.21* (-3.25)
MALE	.93 (.26)	-.06 (-.59)	.93 (.25)	.04 (.37)
HSG	.93 (.25)	.02 (.14)	.94 (.23)	-.01 (-.05)
AFQT	58.0 (20.6)	.000 (.04)	59.6 (19.2)	-.002 (-1.26)
TIG(t)	.87 (.71)	.01 (.11)	1.09 (.87)	-.10** (-2.21)
LES(t)	3.16 (1.57)	.03*** (1.74)	2.04 (1.52)	.17* (9.74)
LOS(t)	3.18 (1.14)	-.20* (-5.69)	3.55 (1.24)	-.25* (-7.50)
MOS1	.19 (.39)	.15*** (1.72)	.24 (.42)	-.31* (-3.42)
MOS2	.21 (.41)	.09 (1.00)	.19 (.39)	-.01 (-.16)
MOS3	.16 (.37)	-.33* (-3.32)	.15 (.36)	-.09 (-.92)
MOS4	.14 (.35)	-.30* (-2.93)	.14 (.35)	-.17*** (-1.76)
MOS5	.15 (.36)	-.44* (-4.18)	.14 (.35)	-.21** (-2.13)
Chi square		176.9*		320.4*
Degrees of freedom		14		14
Sample size		13,645		26,476

TABLE C-2

LOGIT RESULTS ON SELECTION OF SERGEANTS INTO  
THE BASIC COURSE

Dependent variable for each model: PME(t)

Independent variable	t=1985		t=1986	
	Mean (SD)	Coefficient (t statistic)	Mean (SD)	Coefficient (t statistic)
INTERCEPT		-.78 (-1.56)		-1.94* (-2.73)
RVPERF(t - 1)	4.45 (.87)	-.31* (-5.10)	4.56 (.93)	-.23* (-2.70)
SINGLE	.23 (.42)	.05 (.45)	.25 (.43)	.30*** (1.73)
WHITE	.68 (.47)	-.10 (-.82)	.68 (.47)	-.22 (-1.19)
MALE	.93 (.26)	-.40** (-2.15)	.93 (.26)	-.51** (-2.00)
HSG	.91 (.29)	.34 (1.53)	.91 (.29)	-.05 (-.16)
AFQT	54.0 (23.0)	-.001 (-.54)	54.4 (23.0)	-.001 (-.23)
TIG(t)	2.63 (1.37)	-.26* (-4.64)	3.32 (1.49)	-.33* (-4.36)
LES(t)	3.27 (1.45)	.05 (1.31)	2.26 (1.45)	.07 (1.36)
LOS(t)	6.08 (1.62)	-.09*** (-1.90)	6.81 (1.70)	.04 (.69)
MOS1	.16 (.37)	-.03 (-.19)	.16 (.37)	-.57** (-1.96)
MOS2	.17 (.38)	-.01 (-.07)	.17 (.38)	.01 (.03)
MOS3	.18 (.38)	-.21 (-1.13)	.18 (.39)	-.04 (-.15)
MOS4	.18 (.38)	-.33*** (-1.76)	.17 (.38)	-.49*** (-1.66)
MOS5	.16 (.37)	-.51* (-2.59)	.16 (.37)	-.46 (-1.60)
Chi square		117.5*		60.1*
Degrees of freedom		14		14
Sample size		12,279		12,526

TABLE C-3

LOGIT RESULTS ON SELECTION OF STAFF SERGEANTS INTO  
THE CAREER COURSE

Dependent variable for each model: PME(t)

Independent variable	t=1983		t=1984	
	Mean (SD)	Coefficient (t statistic)	Mean (SD)	Coefficient (t statistic)
INTERCEPT		-.80*** (-1.69)		-.04 (-.10)
RVPERF(t - 1)	4.47 (.84)	-.21* (-4.54)	4.52 (.85)	-.11* (-2.68)
SINGLE	.07 (.26)	.09 (.65)	.08 (.28)	-.08 (-.61)
WHITE	.75 (.43)	-.31* (-3.30)	.74 (.44)	-.14*** (-1.64)
MALE	.97 (.17)	.08 (.34)	.97 (.17)	-.10 (-.50)
HSG	.83 (.37)	.30** (2.41)	.84 (.36)	.14 (1.31)
AFQT	59.1 (20.1)	.003 (1.47)	58.7 (20.6)	-.000 (-.23)
TIG(t)	2.55 (2.07)	-.26* (-6.71)	2.79 (2.19)	-.27* (-8.16)
LES(t)	5.37 (1.47)	.02 (.60)	4.38 (1.48)	.02 (.91)
LOS(t)	8.93 (2.22)	-.27 (-.79)	9.31 (2.27)	-.09* (-2.89)
MOS1	.13 (.34)	.02 (.16)	.13 (.34)	.09 (.75)
MOS2	.17 (.37)	-.19 (-1.45)	.16 (.37)	.10 (.87)
MOS3	.20 (.40)	-.34* (-2.54)	.20 (.40)	-.20*** (-1.66)
MOS4	.15 (.36)	-.08 (-.55)	.15 (.36)	-.17 (-1.28)
MOS5	.19 (.39)	-.52* (-3.64)	.19 (.39)	-.20*** (-1.64)
Chi square		217.0*		326.5*
Degrees of freedom		14		14
Sample size		7,904		7,905

TABLE C-3 (Continued)

Independent variable	t=1985		t=1986	
	Mean (SD)	Coefficient (t statistic)	Mean (SD)	Coefficient (t statistic)
INTERCEPT		-.00 (-.01)		-1.29*** (-1.83)
RVPERF(t - 1)	4.61 (.84)	-.24* (-5.58)	4.71 (.93)	-.10 (-1.47)
SINGLE	.10 (.30)	.01 (.07)	.10 (.30)	.27 (1.50)
WHITE	.74 (.44)	-.08 (-.96)	.75 (.43)	.02 (.12)
MALE	.97 (.18)	.35 (1.56)	.96 (.19)	-.01 (-.04)
HSG	.85 (.36)	.06 (.52)	.85 (.35)	-.05 (-.23)
AFQT	58.2 (21.0)	-.003*** (-1.80)	58.7 (21.0)	-.004 (-1.28)
TIG(t)	3.15 (2.37)	-.30* (-10.25)	3.97 (2.46)	-.31* (-6.20)
LES(t)	3.37 (1.49)	.02 (1.00)	2.37 (1.51)	.13* (3.12)
LOS(t)	9.85 (2.39)	-.02 (-.90)	10.72 (2.45)	-.04 (-.84)
MOS1	.12 (.33)	.43* (3.49)	.11 (.32)	.36 (1.61)
MOS2	.16 (.36)	.05 (.45)	.16 (.36)	.02 (.08)
MOS3	.19 (.39)	-.29** (-2.31)	.19 (.39)	-.03 (-.13)
MOS4	.16 (.37)	-.19 (-1.50)	.17 (.38)	-.33 (-1.44)
MOS5	.20 (.40)	-.50* (-3.82)	.20 (.40)	-.53** (-2.22)
Chi square		411.4*		156.4*
Degrees of freedom		14		14
Sample size		7,555		6,539

TABLE C-4

LOGIT RESULTS ON SELECTION OF MASTER AND FIRST  
SERGEANTS INTO THE ADVANCED COURSE

Dependent variable for each model: PME(t)

Independent variable	t=1984		t=1985	
	Mean (SD)	Coefficient (t statistic)	Mean (SD)	Coefficient (t statistic)
INTERCEPT		-16.98 (-1.17)		-2.95 (-1.54)
RVPERF(t - 1)	5.09 (.71)	.47*** (1.72)	5.14 (.67)	-.13 (-.76)
SINGLE	.02 (.14)	.56 (.02)	.02 (.14)	-.42 (-.39)
WHITE	.83 (.37)	-.17 (-.44)	.83 (.37)	-.83* (-3.02)
MALE	.99 (.09)	8.14 (.08)	.99 (.10)	-.64 (-.59)
HSG	.77 (.42)	1.39** (2.24)	.78 (.41)	.36 (1.03)
TIG(t)	1.93 (1.66)	-.35** (-2.28)	2.07 (1.62)	-.16 (-1.60)
LES(t)	3.68 (1.15)	.26** (2.03)	2.78 (1.17)	.32* (3.15)
LOS(t)	18.72 (2.74)	.04 (.53)	18.96 (2.54)	.03 (.47)
MOS1	.08 (.27)	1.76* (3.56)	.08 (.28)	.53 (1.38)
MOS2	.20 (.40)	-.34 (-.56)	.19 (.39)	.03 (.09)
MOS3	.18 (.39)	-.14 (-.24)	.19 (.39)	-1.15** (-2.37)
MOS4	.18 (.39)	-.07 (-.12)	.18 (.38)	-.14 (-.34)
MOS5	.18 (.38)	-1.21 (-1.46)	.18 (.38)	-1.21** (-1.13)
Chi square		57.1*		49.7*
Degrees of freedom		13		13
Sample size		2,317		2,739

**APPENDIX D**

**LOGIT RESULTS FOR RESIDENT VERSUS  
CORRESPONDENCE COURSES**



## **APPENDIX D**

### **LOGIT RESULTS FOR RESIDENT VERSUS CORRESPONDENCE COURSES**

In this appendix, the PME selection model is modified by using those who have completed the correspondence version of the course as the control group. Data on students taking either the Basic resident or correspondence courses in 1985 or 1986 are pooled. Separate logit equations are estimated for corporals and sergeants in table D-1. Data on staff sergeants who completed the Career resident or correspondence course during the period 1983 through 1986 are pooled in estimating the logit equation shown in table D-2. Significance levels are designated in the following manner: \* indicates significance at the 1-percent level; \*\* indicates significance at the 5-percent level; \*\*\* indicates significance at the 10-percent level.

TABLE D-1

LOGIT RESULTS FOR BASIC RESIDENT VERSUS  
CORRESPONDENCE COURSES (t=1985 to 1986)

Dependent variable for each model: RESCO(t)

Independent variable	Corporals <sup>a</sup>		Sergeants <sup>a</sup>	
	Mean (SD)	Coefficient (t statistic)	Mean (SD)	Coefficient (t statistic)
INTERCEPT		.08 (.23)		4.69* (4.52)
RVPERF(t - 1)	5.04 (1.09)	.11* (3.49)	4.30 (.89)	-.33* (-2.69)
SINGLE	.57 (.50)	-.24* (-3.79)	.29 (.45)	-.10 (-.41)
WHITE	.75 (.43)	-.19** (-2.37)	.64 (.48)	.14 (.58)
MALE	.93 (.25)	-.16 (-1.25)	.90 (.30)	-.71 (-1.49)
HSG	.95 (.22)	-.16 (-1.03)	.93 (.25)	-.07 (-.14)
AFQT	60.7 (20.7)	-.007* (-4.08)	53.2 (23.4)	-.002 (-.39)
TIG(t)	.82 (.75)	.05 (.76)	2.41 (1.26)	-.37* (-3.27)
LES(t)	2.84 (1.54)	.08* (3.93)	3.04 (1.53)	.10 (1.38)
LOS(t)	3.02 (1.23)	.22* (5.72)	5.95 (1.62)	-.04 (-.39)
MOS1	.22 (.41)	-.17 (-1.60)	.17 (.37)	-.23 (-.63)
MOS2	.20 (.40)	.01 (.11)	.18 (.39)	.53 (1.34)
MOS3	.14 (.34)	-.11 (-.91)	.16 (.37)	.33 (.85)
MOS4	.16 (.37)	-.54* (-4.83)	.17 (.38)	-.83** (-2.29)
MOS5	.13 (.34)	-.61* (-5.25)	.13 (.34)	-.71** (-1.95)
Chi square		333.3*		56.1*
Degrees of freedom		14		14
Sample size		4,658		662

a. Grade in year t.

TABLE D-2

**LOGIT RESULTS FOR CAREER RESIDENT VERSUS  
CORRESPONDENCE COURSES (t=1983 to 1986)**

Dependent variable for each model: RESCO(t)

Independent variable	Staff sergeants <sup>a</sup>	
	Mean (SD)	Coefficient (t statistic)
INTERCEPT		1.51* (3.41)
RVPERF(t - 1)	4.52 (.85)	-.29* (-6.42)
SINGLE	.10 (.30)	.09 (.72)
WHITE	.71 (.45)	-.28* (-3.11)
MALE	97 (.17)	.48** (2.27)
HSG	87 (.34)	.02 (.17)
AFQT	57.9 (20.9)	-.002 (-.75)
TIG(t)	2.07 (1.60)	-.18* (-5.21)
LES(t)	4.08 (1.74)	.17* (7.57)
LOS(t)	8.75 (1.78)	.01 (.29)
MOS1	.15 (.35)	.63* (4.26)
MOS2	.17 (.37)	-.07 (-.52)
MOS3	.18 (.38)	-.29** (-2.32)
MOS4	.17 (.37)	-.33* (-2.49)
MOS5	.17 (.38)	-.62* (-4.88)
Chi square		298.6*
Degrees of freedom		14
Sample size		3,418

a. Grade in year t.

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